

Animal rights, animal minds, and human mindreading

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Do non-human animals have rights? The answer to this question depends on whether animals have morally relevant mental properties. Mindreading is the human activity of ascribing mental states to other organisms. Current knowledge about the evolution and cognitive structure of mindreading indicates that human ascriptions of mental states to non-human animals are very inaccurate. The accuracy of human mindreading can be improved with the help of scientific studies of animal minds. However, the scientific studies do not by themselves solve the problem of how to map psychological similarities (and differences) between humans and animals onto a distinction between morally relevant and morally irrelevant mental properties. The current limitations of human mindreading—whether scientifically aided or not—have practical consequences for the rational justification of claims about which rights (if any) non-human animals should be accorded.

these intuitions are misleading. Considerations about the evolutionary origins (section 2) and cognitive underpinnings (section 3) of the human ability to ascribe mental states to others—in conjunction with considerations about the complex nature of the relation between human minds and animal minds—imply that human attributions of mental states to animals are often extremely inaccurate (section 4). The accuracy of mental ascriptions to animals can (and should) be improved by rigorous scientific studies of animal minds. No form of anthropomorphism is helpful in this context. Scientific studies, however, can only provide information about similarities and differences between humans and animals and not about how to make sense of these similarities and differences in terms of distinctions between morally relevant and morally irrelevant properties (section 5). Spelling out the difficulties involved in understanding animal minds for the purposes of moral theory is important and may give firmer foundations to the animal rights debate (section 6).

Humans use non-human animals in biomedical research, xenotransplantation, drug production, and food production. Even if they can benefit the animals, these kinds of animal use are usually designed for and motivated by the benefits that they bring to humans. Because of this, they are seen by some authors and by some members of the general public as morally problematic. Are these concerns justified? Do animals have a right not to be used by humans in these ways? If so, which animals have such a right? Different ethical theories give different answers to these questions. Even so, most theories agree that the mental states of an animal are important in determining which moral rights or moral status (if any) the animal should be granted.¹ The disagreements are about the identity of the morally important mental properties, not about the existence of such properties. Current views focus on pain or more generally on sentience^{2–3}; desires and preferences (such as preferences about not being in pain)^{4–5}; self consciousness,^{6–7} or mental abilities such as being able to give consent, being able to assume moral responsibility, etc.⁸

Theories about animal rights often assume that all or most of the ethically important questions about animal minds have already been answered. People often have strong intuitions about whether the animals of this or that particular species feel pain, or have preferences, or are self conscious. We shall argue that recent advances in cognitive science and human evolutionary theory strongly support the view that

1. THE EVOLUTION OF HUMAN MINDREADING

Humans are good mindreaders of other humans. In the current psychological literature, “mindreading” refers to a common human activity rather than a paranormal phenomenon. Humans ascribe mental states (such as beliefs, desires, intentions, emotions, sensations, etc) to other human beings. Often such ascriptions are accurate and can be used to predict and explain the behaviour of other humans. These ascriptions are achieved by means of simple everyday interactions, such as the observation of someone’s linguistic and non-linguistic behaviour.^{9–11} The accurate ascription of mental states to other humans often requires no significant mental effort. Sometimes, it is reflex-like. There are, for example, circumstances in which observing someone’s facial expression automatically prompts the thought that the person in question is in a state of pain, or anger, or joy, or that the person is probably lying, etc.

Despite its effortlessness, mindreading is a very sophisticated cognitive task. From the way people talk and ascribe mental states, we can infer that mental states are internal unobservable states that, via complex interactions with other mental states and with the external environment, are responsible for behaviour.^{12–13} That is, mental states have complex causal roles. It is therefore surprising that humans are able to track these states both effortlessly and

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accurately. The only way to explain this phenomenon is to posit the existence of some very sophisticated piece of cognitive machinery specifically designed to generate rapid and accurate mindreading. As we shall show in the following section, different theories exist about how exactly this cognitive machinery works, but everyone agrees that such machinery is rather complex. This fact can be used to make some interesting inferences.

Complex cognitive machinery is very costly. It is costly in terms of metabolic consumption, development, maintenance, and in terms of the risk of malfunctioning (the more complex a piece of machinery is, the more likely it is that something will go wrong).^{14–15} All these costs affect biological fitness in a negative way. This means that complex cognitive machinery can evolve only if there is a selection pressure in favour of it that is stronger than the selection pressure generated by the high costs attached to the machinery.¹⁴ The fitness advantages conferred by the machinery must be significant.

There are important disagreements among primatologists about the degree of sophistication and accuracy of mindreading skills in non-human primates.^{16–21} Even so, all researchers in this field agree that mindreading skills in non-human primates are vastly less sophisticated and accurate than they are in humans. Thus, the unique features and accuracy of human mindreading must have evolved after the split between the hominin and the chimpanzee lineage (five to seven million years ago). The received view about the evolution of such special abilities is the “social intelligence hypothesis”. According to this theory, mindreading skills have evolved in order for humans to be able to interact properly (in terms of fitness maximisation) with other humans.^{14–18–22}

The social intelligence hypothesis comes in different versions. On one plausible version, the explanation of the evolution of human mindreading has two parts. The first part has to do with within-group cooperation. Some ecological trigger—perhaps a change in niche, such as the transition from woodland habitats to the savannah¹⁴—selected for increased cooperation in humans. Intense and efficient cooperation requires that the cooperating organisms be able to keep track of each other’s mental states accurately. The better the tracking, the more efficient the cooperation. Thus, selection for increased cooperation resulted in selection for increased accuracy in the ascription of mental states. But in a species where cooperation is important, different groups of cooperating organisms can compete with each other. Groups formed by humans that were good at cooperating with each other out-competed groups formed by humans that were less good at cooperating. Thus, cooperation resulted in selection for more efficient cooperation, which resulted in selection for even more efficient cooperation, and so on. This means that mindreading resulted in selection for more accurate mindreading, which resulted in selection for even more accurate mindreading, and so on.

The second part of the explanation has to do with within-group competition. Mental ascription can be used not only to cooperate efficiently but also to deceive efficiently. Deception is particularly advantageous in cooperative groups because it can result in successful free riding. The deceiving organism may be able to receive all the benefits of cooperation without actually cooperating—that is, without paying any of the costs. The better one is at mindreading, the better one is at deceiving. And the better one is at mindreading, the less likely one is to be deceived. Thus, human increased reliance on cooperative life selected for more accurate mindreading for the purposes of deception, which in turn selected for more accurate mindreading for the purposes of deception avoidance, which in turn selected for even more accurate mindreading for the purposes of more sophisticated deception, and so on.

As has been said, this is only one possible version of the social intelligence hypothesis. What all versions have in common is the claim that—apart perhaps from the initial trigger—the evolution of mindreading in humans was the result of an arms race *within* the human lineage (or more generally within the hominin lineage) and it was not the result of competition between the humans (or hominins) and some other species. This internal arms race resulted, via a set of interconnected runaway processes, in a gradual but relatively rapid increase in the accuracy and sophistication of human mindreading. That is, the evolution of human mindreading was generated by selection pressures internal to the human (hominin) lineage rather than by selection pressures external to the lineage. We shall see (sections 4 and 5) that this claim has important implications for any view about the human ability to understand animal minds and, thereby, if accurate mindreading is to play a role in the attribution of rights, for any view about animal rights.

2. HUMAN MINDREADING IN MODERN HUMANS

How exactly do modern humans mindread each other? Different views exist about the cognitive underpinnings of mindreading. One view is that the attribution of mental states to other humans occurs via a process of mental simulation.^{23–26} This consists in using one’s own psychological mechanisms to model the psychological mechanisms of another person. On this account, mindreading works as follows: the mindreader takes a part of her own psychological system “off line”, she pretends that she is in the situation of the other person, she observes the mental states that this off line use of her own psychological system provokes in her, and finally she attributes to the other person the mental states provoked by the simulation. Simulation theorists claim that mindreading occurs by imaginatively “putting oneself in the other’s place”. In some cases, the simulation is initiated by a conscious decision, as in the case of a person who deliberates to determine what she would think (believe, desire, feel, etc) if she were in the same situation as another person. In other cases, the simulation occurs automatically. Consider—for example, a woman who observes a friend accidentally hitting his finger when using a hammer. As a result of this observation and without any conscious decision, the woman immediately imagines what she would feel if she had hit her own finger with a hammer, and she almost feels the pain herself. Empathy and emotional contagion are a form of mental simulation: they help keeping track of the mental states of another person by generating in the mindreader an emotional state similar to that occurring in the target.

According to another view, mindreading is underpinned by an implicit theory. On this account, adult humans possess a large set of tacit belief-like states that amount to a prescientific theory about the way the human mind works, a “folk psychology”.^{27–30} The items of information present in this folk psychology are about the causal roles of mental states. They are about the way mental states interact with external stimuli (via the operation of the senses), the way they bring about action (via movement), and the way they interact with each other (via reasoning, emotional dispositions, etc). Folk psychology is thought, for example, to contain belief-like states with the following content: people whose bodies are injured usually feel pain; people located in front of a midsized object with their eyes open usually have a visual perception of the object; people with such and such facial expression are likely to be in such and such an emotional state, and people who strongly desire X and think that doing Y is likely to result in X will often do Y, etc. When the behaviour of a person is observed, folk psychology can be used to infer the mental states that are likely to have generated that behaviour. The inferred mental states can

then be attributed to the person. If the implicit theory is accurate, this process results in accurate mindreading.

Theorists who believe in the existence of a folk psychology can be divided into two camps. According to some authors, folk psychology is innate (unlearned).^{27–29} According to others, folk psychology is a theory that normal humans acquire during childhood through interactions with other humans.^{14–30} Theorists from both camps implicitly agree that, whether innate or not, folk psychology is an implicit theory about *human* minds—as opposed to, say, *all possible* or even *all actual* minds. We shall show below that this fact has important implications for debates about animal rights (sections 4 and 5).

The simulationist view and the folk psychology view (also known as the theory/theory view) are not incompatible. Some theorists have recently tried to elaborate hybrid accounts according to which both simulations and implicitly represented information play a role in human mindreading.^{9–14} These hybrid accounts are able to overcome the explanatory limitations of each view considered separately. Moreover, hybrid accounts find some support in evolutionary thinking. If the selection pressures for mental state tracking were as strong as suggested by the social intelligence hypothesis (see previous section), one would expect natural selection to have produced and recruited as many cognitive mechanisms as possible for the purpose of accurate mindreading.

4. THE INTERACTION OF HUMAN MINDREADING AND ANIMAL MINDS

How accurate is human mindreading in the case of non-human animals? The considerations presented in the previous two sections indicate that—on the assumption that animal minds are significantly different from human minds—the answer is: *not accurate at all*.

Let us start with the evolutionary considerations of section 2. On the social intelligence hypothesis, human mindreading skills have evolved because of selection pressures arising *from within* the human species. In order to survive and reproduce, our ancestors needed to be able to keep track of the mental states of their conspecifics so as to be able to cooperate efficiently with those who were willing to reciprocate and to avoid being deceived and exploited by others. Natural selection did not design human cognitive mechanisms for the purpose of tracking the mental states of the members of other species. Thus, human mindreading skills are unlikely to be good at tracking the mental states of non-human animals. The greater the difference between human minds and the minds of members of another species, the more unreliable human mindreading is likely to be.

The discussion in section 3 points to the same conclusion. Let us suppose that the simulationist view of human mindreading is correct. Mental simulation results in accurate mindreading only to the extent that the psychological mechanisms of the mindreader are similar to the psychological mechanism of the target. In the absence of a strict similarity, the simulation will result in the wrong attribution. Someone can try, for example, to mentally simulate a laboratory rat. This person can use her psychological mechanisms off line and try to determine what she would think (believe, desire, feel, etc) if she was a laboratory rat. This imaginative exercise could certainly yield interesting results, but if there are significant dissimilarities between human minds and the minds of laboratory rats, the mental states provoked by the simulation will be very different from what laboratory rats actually think, believe, desire, and feel.

Let us now suppose that the folk psychology view of human mindreading is correct. According to this view, human mindreading depends on the application of an

implicit prescientific theory. If folk psychology is innate, then—given the social intelligence hypothesis—it must have evolved to produce accurate mindreading of humans. If folk psychology is learned, then it is learned during childhood by observing and trying to make sense of the behaviour of other humans. That is, whether it is learned or innate, folk psychology is bound to be a theory of *human* minds. Thereby, the application of this theory to animals is going to result in inaccurate ascriptions.

If—as is likely—the right account of human mindreading is the hybrid one, things do not improve. The combination of mental simulation and folk psychology is the combination of two methods that are reliable at mindreading humans but not at mindreading animals. Such a combination would result in a hybrid tool that is accurate in the case of humans but not in the case of animals.

These claims about the unreliability of human mindreading in the case of animal minds depend on the assumption that the minds of animals are significantly different from human minds. Is this assumption justified? On a very popular and entrenched view, the minds of non-human animals are nothing but simplified versions of human minds. According to this view, the cognitive abilities of all living organisms can be arrayed within a single dimension, from the simplest up to the most sophisticated—and the most cognitively sophisticated are usually taken to be the adult members of the human species. This array constitutes a sort of Great Chain of Being. The usual way in which this view is applied is by looking for superficial similarities between humans and other species. The more numerous and salient are the human-like observable features of the members of a given species, the more cognitively similar to human beings—and thereby the more cognitively sophisticated—these organisms are taken to be.

The Great Chain of Being is part of the vernacular understanding of the biological world, but some have tried to provide an evolutionary justification for it in terms of a phylogenetic ladder or an evolutionary continuum. The idea is that over time natural selection produces increased cognitive sophistication along a single dimension. Simple organisms alive today are the evolutionarily frozen descendants of their simple ancestor—that is, they have not evolved. In contrast, complex organisms are the recent outcome of the progressive evolutionary process. The more recently a given species has had a common ancestor with humans, the more cognitively similar to human beings—and thereby the more cognitively sophisticated—the members of this species are supposed to be.

Such views of the relations among species are incorrect. Cognitive evolution is not a process of monodimensional increase in complexity. It would be wrong, for example, to assume that humans have all the cognitive adaptations of chimpanzees plus some cognitive adaptations that the human lineage evolved after the two lineages split. Both the human lineage and the chimpanzee lineage have evolved after the two lineages separated. Thus, humans are likely to have cognitive adaptations that chimpanzees do not have *and vice versa*. Both in the case of chimpanzees and in the case of humans, the species-specific adaptations that evolved in the last five million years resulted from the elaboration and combination of previously existing adaptations, but in the two cases the evolutionary process proceeded in different directions.²¹

There is no single dimension of cognitive complexity along which all species can be arrayed. In different lineages, according to the specific developmental/metabolic/structural constraints existing within the lineage and according to the specific adaptive demands generated by the environment in which the lineage lives, natural selection builds different

cognitive adaptations. The evolution of life is tree like and different branches of the tree can point in different directions, making it impossible to identify a single evolutionary ladder. There is also an additional problem. Even if one focuses on a single criterion of cognitive sophistication, it is important to realise that natural selection can result in more or less cognitive sophistication with respect to that criterion. The reason for this is that cognitive sophistication is costly. Cutting such costs by reducing the amount of sophisticated cognitive machinery can result in higher relative fitness. Thus, natural selection often results in the evolution of less complex cognitive structures.

The minds of organisms of different species differ in profound and multidimensional ways. By putting this together with what was said above about the evolution and cognitive underpinnings of human mindreading, we reach the conclusion that human mindreading is likely to be very inaccurate in the ascription of mental states to animals. The lack of a single dimension along which all minds can be arrayed means that the use of mental simulation and folk psychology to understand animals is likely to result not only in *over-ascription* but also in *under-ascription*. That is, these two mindreading methods will often lead to the ascription to animals of mental states they do not have but also to the non-ascription of mental states that the animals do have. That is, simulation and folk psychology generate many false positives as well as many false negatives.

One final thing to notice is that arguments very similar to those we have just presented show that normal humans are not good mindreaders of marginal humans. Obviously, this has important implications for the animal debate—where marginal humans are often invoked—as well as for many other debates in bioethics. For reasons of space, we shall not address this important issue here.

5. ANTHROPOMORPHISM AND SCIENCE

When thinking about animal minds, human beings are usually guilty of anthropomorphism. Humans tend to interpret animal behaviour in the same way they interpret human behaviour and to ascribe to animals states similar to those they ascribe to themselves. Anthropomorphism has often been criticised, but such criticisms have often been based on intuition. In contrast, the previous two sections explain the mistakes produced by anthropomorphic interpretations of non-human animals in terms of (1) the evolutionary origins and cognitive underpinnings of human mindreading and (2) the current understanding of evolutionary processes and of the similarity of relations between species. Humans have evolved to mindread other humans in an accurate, rapid, almost reflexive way. For this reason, many human mindreading mechanisms are triggered by instances of animal behaviour that superficially resemble instances of human behaviour; but the superficial similarities are very poor indicators of deeper similarities in the mental states that cause the behaviours.

In the context of discussions about the ethical issues raised by the use of animals in research, Morton and colleagues³¹ have suggested the replacement of “uncritical anthropomorphism” with what they call “critical anthropomorphism”. Uncritical anthropomorphism is the kind of anthropomorphism generated by untutored commonsense intuitions about animal minds. In contrast, in critical anthropomorphism—the authors suggest—“empathy is tempered by objective knowledge of the particular species’ (or individual animal’s) life history, behaviour, and physiology”.³¹ We agree that critical anthropomorphism is better than uncritical anthropomorphism, but we also think it is not good enough.

In view of what has been said above about human mindreading, a reliance on empathy in dealing with animals is unjustified. Because of the way it has been designed by evolutionary processes, and because of the way it works, empathy is not a reliable way of understanding non-human animals. Thus, someone who wants to gain an accurate understanding of the minds of non-human animals should aim at eliminating rather than “tempering” empathy. One should rely exclusively on rigorous scientific studies of animal minds in order to determine which kinds of mental states non-human organisms have.³² Such studies can certainly advance our understanding of animal minds. Many new and interesting facts about animal minds are discovered every day thanks to the application of sophisticated experimental, observational, and statistical techniques by keen researchers.

Scientific animal psychology—SAP for brevity—includes behavioural studies (both in the wild and in the laboratory) as well as neuroanatomical studies, brain imaging studies, physiological studies, etc. SAP is a prosthetic device. Without the tools and the methods of science, human minds are not good at “reading” animal minds. SAP provides some “spectacles” by means of which humans can try to remedy this deficiency: and such spectacles often work. In spite of this, one should be aware of the fact that it is often extremely difficult to use scientific discoveries about animal minds to decide whether animals should be granted mental status and if so what kind of mental status they should be granted.

Let us consider, for example, the recent studies about nociception in certain species of fish. Nociception is the process by means of which some areas of the central nervous system receive information—from the peripheral nervous system—about tissue damage or about the presence of some potentially noxious stimulus. Sneddon and colleagues³³ argue that cutaneous nociception occurs in the rainbow trout (*Oncorhynchus mykiss*). They also argue that in this species of fish nociception generates not only reflexive responses (such as withdrawal) but also behavioural and physiological responses that are not reflexive. According to the authors, in animals where nociception is accompanied solely by reflexive responses, there is no pain perception, whereas in animals where nociception is accompanied by a behaviourally flexible response, pain perception occurs. The authors claim that the distinction they draw between mere nociception and what they call “pain perception”—that is, behaviourally flexible nociception—is a distinction between a morally irrelevant property and a morally relevant one.

Unfortunately, things are not so easy. Let us suppose that Sneddon and colleagues are right in claiming that nociception in the rainbow trout generates responses that exhibit a certain (even though limited) degree of behavioural flexibility. From this, it follows that what goes on inside a trout when nociception occurs is in some (limited) respects similar to what goes on in humans when they are in pain. Trout nociception is similar to human nociception. This (in some respects rather limited) similarity between trout nociception and human nociception is perhaps sufficient to justify the claim that there is a sense in which some of the mental states of a trout can be said to be pain states. However, is the sense in which the states of the trout count as pain states the morally relevant sense of “pain”? That is, does the trout feel pain in the morally relevant sense? The studies showing the presence of behaviourally flexible nociception do not by themselves answer this question. As has been said, the studies only show that there exist some very interesting similarities (but also differences) between human pain states and some trout states. The mapping of these similarities and differences onto a distinction between what is morally relevant and what is not is a separate question. Also, it is a

difficult question, one for which, not only in this case but in general, no one so far has been able to provide a satisfactory answer. It is certainly possible to use the term “pain” as a technical label to refer to behaviourally flexible nociception; but one cannot jump from this technical use of the term to the morally loaded commonsense use without further justification. The choice of calling behaviourally flexible nociception “pain” does not automatically make this form of nociception morally relevant. One cannot solve controversial issues simply by means of a terminological choice.

To summarise, SAP provides a good (even if fallible) way of identifying many of the important similarities and differences between human minds and animal minds, but it does not itself provide a way to relate these similarities and differences (whether they are characterised in neural, physiological, behavioural, functional, or cognitive terms) to the commonsense understanding of concepts like pain and to the moral connotations that such commonsense understanding carries with it. At the moment, no agreement exists about how to map scientifically accessible mental differences onto distinctions in moral status, and unfortunately no agreement exists about how to evaluate proposals in the area either.

6. CONCLUSIONS AND IMPLICATIONS

Mindreading is the human activity of ascribing mental states to other organisms. We have argued that current knowledge about the evolution and cognitive structure of mindreading indicates that human ascriptions of mental states to non-human animals are very inaccurate. Without the help of scientific tools and methods, humans ascribe to other animals many mental states that the animals do not have and are unable to detect many mental states that the animals do have. If the aim is an accurate understanding of the mental life of non-human animals, anthropomorphism—which is the result of “natural” or “scientifically unaided” mindreading—is to be avoided in all its forms.

Theories about the mental states of animals should be based on rigorous scientific studies. That is, scientific mindreading is to be preferred to natural mindreading; but the results of scientific studies should not be overinterpreted. Studies cannot by themselves determine how to map similarities and differences between human minds and animal minds onto useful distinctions between mental properties that are morally relevant and mental properties that are not morally relevant.

The attribution of morally relevant mental properties to animals should not be based on unsupported intuitions about the similarities between the mental states of animals and the mental states of humans, or on unsupported intuitions about the moral relevance of these similarities. Human mindreading, whether scientifically aided or not, has (at least at the moment) important limitations with respect to the correct attribution of morally relevant mental properties to non-human animals. What are the practical implications of this fact for the question concerning which animals (if any) should be granted a right not to be used by humans in, for example, biomedical research and food production? Suppose some animals have a morally relevant mental property but, because of limitations on human mindreading, human beings are unable to find out by reliable methods whether the animals have this property. Does this human limitation imply that the animals do not have the relevant rights? Does it imply that human beings should not accord the relevant rights to the animals? These are two different questions: and the difference, in this context, is very important.

If the animals of a given species have a morally relevant mental property, and if possession of this property is sufficient for the possession of certain rights, then the

animals of that species have those rights, independently of whether humans are able to reliably detect the possession of the morally relevant mental property by the animals. If, however, they are unable to reliably detect the possession of this mental property, would humans be rationally justified in granting these rights to the animals? One view is that, if humans have no rational basis for ascribing a morally relevant mental property to certain animals, then they have no rational basis for granting the rights associated with that mental property to the animals. Another view is that, even when there is no knowledge about the possession of a morally relevant mental property, humans should still accord the relevant rights to the animals on the basis of a precautionary principle. On this view, if one does not know whether the animals have the morally relevant mental property, one should grant the animals the associated rights because by doing so one avoids the risk of infringing the rights that the animals might have. This latter view, in fact, is not a single view but a family of related views. All these views use a precautionary principle, but some are more liberal than others in the use of such a principle.

It is not the purpose of this paper to discuss the relative merits of these options. We just want to point out that the limitations on human mindreading that we have discussed in this paper imply that the debate about whether it is rational to adopt a precautionary principle in the case of non-human animals (and if so, in which circumstances and with what constraints) should probably be more central to the animal rights debate than people usually take it to be. It is rational to grant rights to animals on the basis of accurate mindreading (in conjunction with a good theory about what are the morally relevant mental properties). It is not rational to grant rights to animals on the basis of inaccurate mindreading. It may, perhaps, be rational to grant rights to animals on the basis of a precautionary principle. This depends on whether the adoption of the precautionary principle in the case of non-human animals is justified. If a precautionary principle is adopted, there should be honesty and transparency about the fact that the decision to accord rights is based on such a principle rather than, say, on empathy. Moreover, if adopted, the precautionary principle should be applied in a coherent way and in a way that is consistent with the best available scientific evidence about the cognitive similarities and differences between species.

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- Interactive workshops – common ethical and editorial dilemmas for editors
- Opportunities to network with other editors and share your experiences and challenges

The seminar is free for COPE members and £30.00 + VAT for non-members. Numbers are limited and early booking is advisable. For registrations or more information please contact the COPE Secretary at cope@bmjgroup.com or call 020-7383-6602

For more information on COPE see www.publicationethics.org.uk